# **RRES PRESS RELEASE 29/01/24 Agricultural fertilisers contribute substantially to microplastic concentrations in UK soils**

*Samples from Rothamsted’s long-term experiments provide valuable evidence*

Microplastic particles are intentionally added to the coating surrounding the fertiliser granules. This forms a barrier that ensures that the nutrients are released more slowly. Annually across the UK, 22,500 tonnes of microplastics are thought to be released from fertilizers and additives. Some microplastics are also deposited from farm machinery or may be wind-blown onto fields.

The soil samples were collected from the Broadbalk winter wheat experiment at 18 different time points between 1846 and 2022 on plots treated with either farmyard manure, inorganic NPK fertilizer or no application. Microplastics were stained with Nile Red and quantified using fluorescence microscopy. A significant increase in microplastic concentrations was observed between 1966 − 2022 across all three treatments. From 1846 − 1914, no microplastics were detected in the samples, consistent with the later invention of modern plastics.

Dr Sam Cusworth of the University of Lancaster who led the study, said, “The impacts of microplastic pollution on agricultural productivity are largely unquantified and unreliable - we simply don’t have enough evidence from longer-term field trials. Given that microplastic concentrations will likely continue to accumulate in agricultural soils from both agricultural and other sources, the effects of microplastics in farming systems should be better understood.”

To date there are no known means by which microplastic accumulation in soils can be reversed, and most reported interactions between microplastics and soil fauna, vegetation, microbiota and crop production appears to have negative effects.

“The accumulation of microplastics in agricultural soils over time poses a direct threat to agricultural productivity and food security,” said Dr Cusworth. “With no immediate solution to remediate microplastic pollution on the horizon, it is critical to reassess our relationship with plastic use in agriculture and beyond.”

The study highlights the ongoing value of Rothamsted’s long term experiments to support new research.  Complete soil and plant sample sets spanning the entire lifetime of the experiments are carefully dried and stored in the Rothamsted Sample Archive. This  provides a unique “time machine” that allows researchers to look back at changes in agriculture and the environment over long periods.

Publication

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